



## NOAA FISHERIES

**PROPOSED ACTION:** Issuance of an Incidental Harassment Authorization to the San Francisco Bay Area Water Emergency Transportation Authority for the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project in San Francisco Bay, CA.

**TYPE OF STATEMENT:** Environmental Assessment

**LEAD AGENCY:** U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service

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**LOCATION:** San Francisco, California.

**ABSTRACT:** This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources' proposal to issue an Incidental Harassment Authorization, pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act, to the San Francisco Bay Area Water Emergency Transportation Authority for the take of small numbers of marine mammals incidental to conducting the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project in San Francisco Bay, CA.

**DATE:** June 2016

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## LIST OF ACRONYMS AND ABBREVIATIONS

CALTRANS	California Department of Transportation
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB	decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
ft	feet
FR	Federal Register
IHA	Incidental Harassment Authorization
m	meter
mi	miles
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OMB	Office of Management and Budget
PSO	Protected Species Observer
PTS	Permanent hearing threshold shift
SAR	NMFS Marine Mammal Stock Assessment Report
SF-OBB	San Francisco and Oakland Bay Bridge
TTS	Temporary hearing threshold shift
USFWS	US Fish and Wildlife Service
WETA	San Francisco Bay Area Water Emergency Transportation Authority

## **Chapter 1 Introduction and Purpose and Need**

### **1.1 BACKGROUND**

The Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1631 et seq.) prohibits the incidental taking of marine mammals. The incidental take of a marine mammal falls under three categories: mortality, serious injury or harassment (i.e., injury and behavioral effects). Harassment<sup>1</sup> is any act of pursuit, torment or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns (Level B harassment). Disruption of behavioral patterns includes, but is not limited to, migration, breathing, nursing, breeding, feeding or sheltering. However, there are exceptions to the prohibition on take in Section 101(a)(5)(D) of the MMPA that gives the National Marine Fisheries Service (NMFS) the authority to authorize the incidental but not intentional take of small numbers of marine mammals by harassment provided certain determinations are made and statutory and regulatory procedures are met. Refer to Chapter 2 for details regarding this exception and NMFS' IHA criteria.

NMFS also promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals, 50 Code of Federal Regulations (CFR) Part 216 and produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA.

#### **1.1.1. Background on WETA's MMPA Application**

On February 8, 2016, NMFS received an application from WETA for the taking of marine mammals incidental to the construction in association with the San Francisco Ferry Terminal Expansion Project, South Basin Improvements project (Project). After NMFS provided comments on the draft IHA application, WETA submitted a revised IHA application on March 28, 2016 and May 2, 2016 with revised take numbers and additional mitigation measures. NMFS determined that the application was adequate and complete on May 13, 2016.

The San Francisco Bay Area Water Emergency Transportation Authority (WETA) is expanding berthing capacity at the Downtown San Francisco Ferry Terminal (Ferry Terminal), located at the San Francisco Ferry Building (Ferry Building), to support existing and future planned water transit services operated on San Francisco Bay by WETA and WETA's emergency operations.

The Downtown San Francisco Ferry Terminal Expansion Project would eventually include phased construction of three new water transit gates and overwater berthing facilities, in addition to supportive landside improvements, such as additional passenger waiting and queuing areas, circulation improvements, and other water transit-related amenities. The new gates and other improvements would be designed to accommodate future planned water transit services between Downtown San Francisco and Antioch, Berkeley, Martinez, Hercules, Redwood City, Richmond, and Treasure Island, as well as emergency operation needs. According to current planning and

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<sup>1</sup> As defined in the MMPA for non-military readiness activities (Section 3 (18)(A))

operating assumptions, WETA will not require all three new gates (Gates A, F, and G) to support existing and new services immediately. As a result, WETA is planning that project construction will be phased. The first phase will include construction of Gates F and G, as well as other related improvements in the South Basin. The project may require up to 23 months for completion; with a maximum of 106 days for pile driving in the first year. In-water activities are limited to occur between July 1 and November 30, 2016 and June 1 through November 30, 2017.

### **1.1.2. Marine Mammals in the Action Area**

The proposed construction project could adversely affect the following marine mammal species under our jurisdiction:

- California sea lion (*Zalophus californianus*)
- Pacific harbor seal (*Phoca vitulina*)
- Northern elephant seal (*Mirounga angustirostris*)
- Northern fur seal (*Callorhinus ursinus*)
- harbor porpoise (*Phocoena phocoena*)
- gray whale (*Eschrichtius robustus*)
- bottlenose dolphin (*Tursiops truncatus*)

## **1.2. Purpose and Need**

### **1.2.1 Description of the Proposed Action**

We propose to issue an Incidental Harassment Authorization (IHA) to the San Francisco Bay Area Water Emergency Transportation Authority (WETA) under the MMPA for the taking of small numbers of marine mammals, incidental to WETA's San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project in San Francisco Bay, CA. We do not have the authority to permit, authorize, or prohibit WETA's activities under Section 101(a)(5)(D) of the MMPA, as that authority lies with a different Federal agency.

Our proposed action is a direct outcome of WETA requesting an IHA under Section 101(a)(5)(D) of the MMPA to take marine mammals, by harassment, incidental to conducting the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project. Pile removal and pile driving activities associated with that Project have the potential to take, by harassment, marine mammals. WETA therefore requires an IHA for incidental take.

Our issuance of an IHA to WETA is a major federal action under the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations in 40 CFR §§ 1500-1508, and NOAA Administrative Order (NAO) 216-6, May 20, 1999, as preserved by NAO 216-6A, "Compliance with the National Environmental Policy Act, Executive Orders 12114, Environmental Effects Abroad of Major Federal Actions; 11988 and 13690, Floodplain Management; and 11990, Protection of Wetlands." Thus, we are required to analyze the effects of our proposed action.

This Environmental Assessment (EA), titled “*Issuance of an Incidental Harassment Authorization to the San Francisco Bay Area Water Emergency Transportation Authority for the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project*,” (hereinafter, EA) addresses the potential environmental impacts of two alternatives, namely:

- Issue the Authorization to WETA under the MMPA for Level B harassment of marine mammals during WETA’s construction project, taking into account the prescribed means of take, mitigation measures, and monitoring requirements required in the proposed Authorization; or
- Not issue an Authorization to WETA in which case, for the purposes of NEPA analysis only, we assume that the activities would proceed and cause incidental take, without the mitigation and monitoring measures that would otherwise be prescribed in the proposed Authorization.

**1.2.2 Purpose:** The primary purpose of our proposed action—the issuance of an Authorization to WETA—is to authorize (pursuant to the MMPA) the take of marine mammals incidental to WETA’s proposed activities. The IHA, if issued, would exempt WETA from the take prohibitions contained in the MMPA.

To authorize the take of small numbers of marine mammals in accordance with Section 101(a)(5)(D) of the MMPA, we must evaluate the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and not have an unmitigable adverse impact on the availability of affected marine mammal species for certain subsistence uses. We cannot issue an IHA if it would result in more than a negligible impact on marine mammal species or stocks or if it would result in an unmitigable adverse impact on subsistence.

In addition, we must prescribe, where applicable, the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat (i.e., mitigation), paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, we must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. Authorizations must also include requirements or conditions pertaining to the monitoring and reporting of such taking, in large part to better understand the effects of such taking on the species. Also, we must publish a notice of a proposed Authorization in the *Federal Register* for public notice and comment.

The underlying purpose of this action is therefore to determine whether the take resulting from WETA’s San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project would have a negligible impact on affected marine mammal species or stocks and would not have an unmitigable adverse impact on the availability of marine mammals for taking for



subsistence uses, and to develop mitigation and monitoring measures to reduce the potential impacts.

**1.2.3 Need:** U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS jurisdiction must submit such a request (in the form of an application). On May 13, 2016, WETA submitted an adequate and complete application demonstrating both the need and potential eligibility for issuance of an IHA in connection with the activities described in section 1.1.1. We now have a corresponding duty to determine whether and how we can authorize take by Level B harassment incidental to the activities described in WETA's application. Our responsibilities under section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame the need for this proposed action.

Any alternatives considered under NEPA must meet the agency's statutory and regulatory requirements. Our described purpose and need guide us in developing reasonable alternatives for consideration, including alternative means of mitigating potential adverse effects. Thus, we are developing and analyzing alternative means of developing and issuing an Authorization, which may require the applicant to include additional mitigation and monitoring measures in order for us to make our determinations under the MMPA.

### **1.3. The Environmental Review Process**

In accordance with the Council on Environmental Quality (CEQ) Regulations and Agency policies for implementing the National Environmental Policy Act (NEPA), NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within National Oceanic Atmospheric Administration (NOAA), (e.g., the Office of the National Marine Sanctuaries) and with other regulatory agencies (e.g., the U.S. Fish and Wildlife Service), as appropriate, during NEPA reviews prior to implementation of a proposed action to ensure that requirements are met. Regarding the issuance of IHAs, we rely substantially on the public process required by the MMPA for preparing proposed IHAs to develop and evaluate relevant environmental information and provide a meaningful opportunity for public participation when we prepare corresponding NEPA documents. We fully consider public comments received in response to the publication of proposed IHAs during the corresponding NEPA review process.

#### **1.3.1 NATIONAL ENVIRONMENTAL POLICY ACT**

NEPA requires federal agencies to examine the environmental impacts of their proposed actions within the United States and its territories. A NEPA analysis is a detailed public document that provides an assessment of the potential effects a major federal action may have on the human environment, which includes the natural and physical environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct or approve. NMFS issuance of IHAs allow for the taking of marine mammals albeit consistent with

provisions under the MMPA and incidental to the applicant's activities, is considered a major federal action; therefore, NMFS analyzes the environmental effects associated with authorizing incidental takes of protected species and prepares the appropriate NEPA documentation.

### 1.3.2 SCOPING AND PUBLIC INVOLVEMENT

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences and take actions to protect, restore, and enhance the environment. An integral part of the NEPA process is public involvement. Early public involvement facilitates the development of an EA and informs the scope of issues to be addressed in the EA. Although agency procedures do not require public involvement prior to finalizing an EA, NMFS determined that the publication of the proposed IHA was the appropriate step to involve the public in order to understand the public concerns for the proposed action, identify significant issues related to the proposed action and obtain the necessary information to complete an analysis.

The Draft EA and Federal Register notice of the proposed IHA, combined with our preliminary determinations, supporting analyses, and corresponding public comment period are instrumental in providing the public with information on relevant environmental issues and offering the public a meaningful opportunity to provide comments to us for consideration in both the MMPA and NEPA decision-making processes. We posted WETA's application on our website concurrently with the release of the Federal Register notice of the proposed Authorization and this EA.

### **MMPA APPLICATION AND NOTICE OF THE PROPOSED AUTHORIZATION**

The CEQ regulations (40 CFR § 1502.25) encourage federal agencies to integrate NEPA's environmental review process with other environmental reviews. We rely substantially on the public process for developing proposed Authorizations and evaluating relevant environmental information and provide a meaningful opportunity for public participation as we develop corresponding EAs. We fully consider public comments received in response to our publication of the notice of proposed Authorization during the corresponding NEPA process.

We considered WETA's proposed mitigation and monitoring measures and determined that they would help ensure that the Project would effect the least practicable impact on marine mammals. These measures include: (1) using pile driving energy attenuators (such as an air bubble curtain system) for all impact pile driving; (2) conducting in-water construction only during daylight hours, when visual monitoring of marine mammals can be conducted; (3) implementing a soft start for all impact pile driving; and (4) implementing shutdown measures if a marine mammal is observed within a zone of influence that may cause injury. Through the MMPA process, we preliminarily determined that, provided that WETA implements the required mitigation and monitoring measures, the impact of the Project on marine mammals would be, at worst, a temporary modification in behavior of small numbers of certain species of marine mammals that may be hauled out in the vicinity of the proposed activity.

We will also prepare a Federal Register notice on the proposed activity and request that the public submit comments, information, and suggestions concerning WETA’s request, the content of our proposed IHA, and potential environmental effects related to the proposed issuance of the Authorization. This EA incorporates by reference and relies on WETA’s application (WETA, 2016).

In summary, the analyses referenced above support our conclusion that, with the incorporation of the proposed monitoring and mitigation measures, the issuance of an IHA to WETA for the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project would not result in any significant direct, indirect, or cumulative impacts. Based on our MMPA analysis, the intermittent frequency and short duration of the harassment from the construction project would allow adequate time for the marine mammals to recover from potentially adverse effects. Furthermore, the referenced analyses concluded that additive or cumulative effects of the construction project on its own or in combination with other activities, are not expected to occur. Finally, the analyses support our conclusion that no significant additive or cumulative effects of the project on its own or in combination with other activities would occur.

## 1.4 Other Environmental Laws or Consultations

### 1.4.1 Scope of Environmental Analysis

Given the limited scope of the decision for which we are responsible (*i.e.*, issue the IHA including prescribed means of take, mitigation measures, and monitoring requirements, or not issue the IHA), this EA provides more focused information on the primary issues and impacts of environmental concern related specifically to our issuance of the IHA. Therefore, this EA does not further evaluate effects to the elements of the human environment listed in Table 1.

**Table 1. Components of the human environment not affected by our issuance of an IHA.**

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans	Essential Fish Habitat	Military Activities
Non-Indigenous Species	Geography	Oil and Gas Activities
Seabirds	Land Use	Recreational Fishing
	Oceanography	Shipping and Boating
	State Marine Protected Areas	National Historic Preservation Sites
	Federal Marine Protected Areas	National Trails and Nationwide Inventory of Rivers
	National Estuarine Research Reserves	Low Income Populations
	National Marine Sanctuaries	Minority Populations
	Park Land	Indigenous Cultural Resources
	Prime Farmlands	Public Health and Safety
	Wetlands	Historic and Cultural Resources
	Wild and Scenic Rivers	

	Ecologically Critical Areas	
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#### **1.4.2 Marine Mammal Protection Act**

The MMPA and its provisions that pertain to the proposed action are discussed above in section 1.2.

#### **1.4.3 Magnuson-Stevens Fishery Conservation and Management Act**

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1801 et seq.), Federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSA.

EFH has been identified in the waters of San Francisco Bay. EFH is present in the study area for Pacific groundfish, coastal pelagics, and Pacific Coast salmon. Pacific groundfish species include species of rockfishes, flatfishes, sharks, etc. Coastal pelagic species include northern anchovy, Pacific sardine, and jack mackerel. Pacific Coast Salmon include chinook and coho salmon. NMFS has established environmental work windows for dredging for Chinook salmon in San Francisco Bay between June 1 and November 30.

In addition to EFH designations, San Francisco Bay is designated as a Habitat Areas of Particular Concern (HAPC) for various fish species in the Pacific Groundfish and Coastal Pelagic Fishery Management Plans, because this estuarine system serves as breeding and rearing grounds important to these fish stocks.

With regard to EFH in the action area, the Federal Transit Authority (FTA) has determined, and WETA supports, the determination that:

- Although short-term and only during construction activities, the project *may adversely affect* EFH in the action area through the noise-related impacts and localized increases in turbidity caused by dredging. Expansion of the ferry pier would create underwater structures, permanently altering a very small portion of EFH in the action area. This may increase habitat value for some species of groundfish.
- EFH may be disturbed due to pile-driving and dredging activities, which *may adversely affect* EFH for Pacific salmon species.

FTA and WETA have initiated consultation with NMFS under the Magnuson-Stevens Fishery Conservation and Management Act. While the proposed construction activities would have adverse effects on EFH, NMFS's proposed action of issuing an Authorization for the harassment of marine mammals will not impact EFH. NMFS's proposed action would only allow incidental take of marine mammals, not permit the construction activities.

#### **1.4.4 Endangered Species Act**

The Endangered Species Act (ESA) established protection over and conservation of threatened and endangered species (T&E) and the ecosystems upon which they depend. An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the near future throughout all or in a significant portion of its range. The USFWS and NMFS jointly administer the ESA and are responsible for the listing of species (designating a species as either threatened or endangered) and designating geographic areas as critical habitat for (T&E) species. The ESA generally prohibits the “take” of an ESA-listed species unless an exception or exemption applies. The term “take” as defined in section 3 of the ESA means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Section 7(a)(2) requires each federal agency to ensure that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action may affect a listed species, that agency is required to consult with NMFS and/or the USFWS under procedures set out in 50 CFR Part 402. NMFS and USFWS can also be action agencies under section 7. Informal consultation is sufficient for species the action agency determines are not likely to be adversely affected if NMFS or USFWS concurs with the action agency’s findings, including any additional measures mutually agreed upon as necessary and sufficient to avoid adverse impacts to listed species and/or designated critical habitat.

General and specific conservation measures are proposed that would avoid and minimize, to the maximum extent practicable, the project’s potential impacts to steelhead, critical habitat for steelhead, Chinook salmon, critical habitat for Sacramento River winter-run Chinook salmon, green sturgeon, critical habitat for green sturgeon, and EFH for a variety of MSA managed species. The Federal Transit Administration (FTA) and the San Francisco Bay Area Water Emergency Transportation Authority (WETA) have initiated consultation with NMFS under the ESA.

NMFS issuance of an IHA is a federal action that is also subject to the requirements of section 7 of the ESA. As a result, we are required to ensure that the issuance of an IHA to WETA is not likely to jeopardize the continued existence of any T&E species or result in the destruction or adverse modification of critical habitat for these species. Two marine mammal species that are listed under the ESA could potentially occur in the action area, but their occurrence is thought to be highly unlikely. Guadalupe fur seals (*Arctocephalus townsendi*) generally do not occur in San Francisco Bay; however, there have been recent sightings of this species due to the El Niño event. Only single individuals of this species have occasionally been sighted inside San Francisco Bay, and their presence near the action area is considered unlikely. No takes are requested for this species, and mitigation measures such as a shutdown zone will be in effect for this species if observed approaching the Level B harassment zone. While it is possible that a humpback whale (*Megaptera navaeangliae*) will enter San Francisco Bay and find its way into the project area during construction activities, their occurrence is unlikely, and measures taken to

minimize and mitigate for effects to gray whales would adequately protect a stray humpback whale if one did enter the project vicinity. Take is not requested for either of these species.

## 1.5 DOCUMENT SCOPE

This EA was prepared in accordance with NEPA (42 USC 4321, et seq.), CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508) and NAO 216-6, “Environmental Review Procedures for Implementing the National Environmental Policy Act”, as preserved by NAO 216-6A. The analysis in this EA addresses potential impacts to the human environment and natural resources, specifically marine mammals and their habitat, resulting from NMFS’ proposed action to authorize incidental takes associated with the WETA project. We analyze direct, indirect, and cumulative impacts related to authorizing incidental take of marine mammals under the MMPA. The scope of our analysis is limited to the decision for which we are responsible (i.e. whether or not to issue the IHA). This EA is intended to provide focused information on the primary issues and impacts of environmental concern, which is our issuance of the IHA authorizing the take of marine mammals incidental the WETA’s activity, and the mitigation and monitoring measures to minimize the effects of that take.

### 1.5.1 Other Factors Influencing the Scope of the Analysis

We have based the scope of the proposed action and nature of the two alternatives considered in this EA on the relevant requirements in section 101(a)(5)(D) of the MMPA. Thus, our authority under the MMPA bounds the scope of our alternatives. We conclude that this analysis—when combined with the analyses in the following documents—fully describes the impacts associated with the proposed construction project with mitigation and monitoring for marine mammals. After conducting a review of the information and analyses for sufficiency and adequacy, we incorporate by reference the relevant analyses on WETA’s proposed action as well as discussions of the affected environment and environmental consequences within the following documents, per 40 CFR §1502.21 and NAO 216-6 § 5.09(d) as preserved by NAO 216-6A, April 22, 2016, §6.01:

- our notice of the proposed Authorization in the *Federal Register* (81 FR 33217, May 25, 2016);
- *Marine Mammal Monitoring Plan* (February 26, 2015)
- *Request for an Incidental Harassment Authorization under the Marine Mammal Protection Act – San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project (Revised May 13, 2016)*

## **Chapter 2 Alternatives**

### **2.1. Introduction**

NEPA and the CEQ implementing regulations (40 CFR §§ 1500-1508) require consideration of alternatives to proposed major federal actions and NAO 216-6, as preserved by NAO 216-6A, provides NOAA policy and guidance on the consideration of alternatives to our proposed action. An EA must consider all reasonable alternatives, including the Preferred Alternative. It must also consider the No Action Alternative, even if that alternative does not meet the stated purpose and need. This provides a baseline analysis against which we can compare the other alternatives.

To warrant detailed evaluation as a reasonable alternative, an alternative must meet our purpose and need. In this case, as we previously explained in Chapter 1 of this EA, an alternative only meets the purpose and need if it satisfies the requirements under section 101(a)(5)(D) the MMPA. We evaluated each potential alternative against these criteria; identified one action alternative along with the No Action Alternative; and carried these forward for evaluation in this EA. This chapter describes the alternatives and compares them in terms of their environmental impacts and their achievement of objectives.

As described in Section 1.2, the MMPA requires that we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider WETA's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measure to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death, wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);
- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);

- Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base; activities that block or limit passage to or from biologically important areas; permanent destruction of habitat; or temporary destruction/disturbance of habitat during a biologically important time; and
- For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Alternative 1 (the Preferred Alternative) includes a suite of mitigation measures intended to minimize potentially adverse interactions with marine mammals. This chapter describes the alternatives and compares them in terms of their environmental impacts and their achievement of objectives.

## **2.2. Description of WETA’s Proposed Activities**

We presented a general overview of WETA’s project in our *Federal Register* notice of proposed Authorization (81 FR 33217; May 25, 2016). We incorporate those descriptions and those found in WETA’s request for incidental take authorization (2016) by reference in this EA and briefly summarize them here.

### **2.2.1. Specified Time and Specified Area**

The project may require up to 23 months for completion; with a maximum of 106 days for pile driving in the first year. In-water activities are limited to occur between July 1 and November 30, 2016 and June 1 through November 30, 2017. If in-water work will extend beyond the effective dates of the IHA, a second IHA application will be submitted by WETA. The proposed authorization is will be effective from July 1, 2016 to December 31, 2016.

The San Francisco ferry terminal is located in the western shore of San Francisco Bay (see Figure 1of WETA’s application). The ferry terminal is five blocks north of the San Francisco Oakland Bay Bridge. More specifically, the south basin of the ferry terminal is located between Pier 14 and the ferry plaza. San Francisco Bay and the adjacent Sacramento-San Joaquin Delta make up one of the largest estuarine systems on the continent. The Bay has undergone extensive industrialization, but remains an important environment for healthy marine mammal populations year round. The area surrounding the proposed activity is an intertidal landscape with heavy industrial use and boat traffic.

### **2.2.2. Detailed Description of Construction Activities**

The project includes the following elements:

- Removal of portions of existing deck and pile construction (portions will remain as open water, and other portions will be replaced)
- Construction of two new gates (Gates F and G)
- Relocation of an existing gate (Gate E)
- Improved passenger boarding areas, amenities, and circulation, including extending the East Bayside Promenade along Gates E, F, and G; strengthening the South Apron of the



Agriculture Building; creating the Embarcadero Plaza; and installing weather protection canopies for passenger queuing.

Implementation of the project improvements will result in a change in the type and area of structures over San Francisco Bay. In some areas, structures will be demolished and then rebuilt. The project will require both the removal and installation of piles as summarized in Table 2. Removal and installation of piles will result in a net increase of 745 square feet of pile-covered area.

**Table 2. Summary of Pile Removal and Installation**

<b>Project Element</b>	<b>Pile Diameter</b>	<b>Pile Type</b>	<b>Method</b>	<b>Number of Piles/ Schedule</b>
Demolition in the South Basin	12 to 18 inches	Wood and concrete	Pull or cut off 2 feet below mud	350 piles/30 days
Removal of Dolphin Piles in the South Basin	36 inches	Steel: 140 to 150 feet in length	Pull out.	Four dolphin piles
Embarcadero Plaza and East Bayside	24 or 36 inches	Steel: 135 to 155 feet in length	Impact or Vibratory Driver	220 24- or 36-inch piles/65 days 2016
Gates E, F, and G Dolphin Piles	36 inches	Steel: 145 to 155 feet in length	Impact or Vibratory Driver	14 total: two at each of the floats for protection; two between each of the floats; and four adjacent to the breakwater
Gate F and G Guide Piles	36 inches	Steel: 140 to 150 feet in length	Impact or Vibratory Driver	12 (6 per gate)/
Gate E Guide Piles	36 inches	Steel: 145 to 155 feet in length	Vibratory Driver for removal, may be reinstalled with an impact driver	Six piles will be removed and reinstalled/12 days 2017
Fender Piles	14 inches	Polyurethane-coated pressure-treated wood; 64 feet in	Impact or Vibratory Driver	38/10 days 2016

Detailed descriptions of these activities are provided below.

### **Pile Removal**

As part of the project, the remnants of Pier 2 will be demolished and removed. This consists of approximately 21,000 square feet of existing deck structure supported by approximately 350 wood and concrete piles. In addition, four dolphin piles will be removed. Demolition will be

conducted from barges. Two barges will be required: one for materials storage, and one outfitted with demolition equipment (crane, clamshell bucket for pulling of piles, and excavator for removal of the deck). Diesel-powered tug boats will bring the barges to the project area, where they will be anchored. Piles will be removed by either cutting them off two feet below the mud line or pulling the pile. The demolition waste from these activities will be disposed of at the nearest waste and recycling facility. Piles that have been treated with creosote, or that contain other potentially hazardous substances, will be handled properly and disposed of at a facility permitted to handle hazardous waste.

## **File Installation**

### *Construction of Gates and Berthing Structures*

The new gates (Gates F and G) will be built similarly. Each gate will be designed with an entrance portal—a prominent doorway providing passenger information and physically separating the berthing structures from the surrounding area. The entrance portal will also contain doors, which can be secured. Berthing structures will be provided for each new gate, consisting of floats, gangways, and guide piles. The steel floats will be approximately 42 feet wide by 135 feet long. The steel truss gangways will be approximately 14 feet wide and 105 feet long. The gangway will be designed to rise and fall with tidal variations while meeting Americans with Disabilities Act (ADA) requirements. The gangway and the float will be designed with canopies, consistent with the current design of existing Gates B and E. The berthing structures will be fabricated off site and floated to the project area by barge. Six steel guide piles will be required to secure each float in place. In addition, dolphin piles may be used at each berthing structure to protect against the collision of vessels with other structures or vessels. A total of up to 14 dolphin piles may be installed.

Chock-block fendering will be added along the East Bayside Promenade, to adjacent structures to protect against collision. The chock-block fendering will consist of square, 12-inch-wide, polyurethane-coated, pressure-treated wood blocks that are connected along the side of the adjacent pier structure, and supported by polyurethane-coated, pressure-treated wood piles.

In addition, the existing Gate E float will be moved 43 feet to the east, to align with the new gates and East Bayside Promenade. The existing six 36-inch-diameter steel guide piles will be removed using vibratory extraction, and reinstalled to secure the Gate E float in place. Because of Gate E's new location, to meet ADA requirements, the existing 90-foot-long steel truss gangway will be replaced with a longer, 105-foot-long gangway.

### *Passenger Boarding and Circulation Areas*

Several improvements will be made to passenger boarding and circulation areas to provide adequate space for passenger queuing; reduce circulation bottlenecks and use conflicts between water transit passengers, users of the Ferry Building, and delivery vehicles; and enhance public

access. New deck and pile-supported structures will be built to meet essential facility standards to support queuing and circulation needs for evacuation purposes in the event of an emergency.

- An Embarcadero Plaza, elevated approximately 3 to 4 feet above current grade, will be created. The Embarcadero Plaza will require new deck and pile construction to fill an open-water area and replace existing structures that do not comply with Essential Facilities requirements. The plaza will include amphitheater steps to provide seating, and could include bicycle racks, planters, and other furnishings as determined in the Final Design.
- The East Bayside Promenade will be extended to create continuous pedestrian access to Gates E, F, and G, as well as to meet public access and pedestrian circulation requirements along San Francisco Bay. It will extend approximately 430 feet in length, and will provide an approximately 25-foot-wide area for pedestrian circulation and public access along Gates E, F, and G. The perimeter of the East Bayside Promenade will also include a curbed edge with a guardrail.
- Short access piers, approximately 30 feet wide and 45 feet long, will extend from the East Bayside Promenade to the portal for each gate. The perimeter of the access piers will also include a curbed edge with a guardrail.
- The South Apron of the Agriculture Building will be upgraded to temporarily support access for passenger circulation. The improvements will include construction of steps and an ADA-accessible ramp to meet the grade of the improved East Bayside Promenade, as well as a guard rail along its edge. Depending on their condition, as determined during Final Design, the piles supporting this apron may need to be strengthened with steel jackets.
- Two canopies will be constructed along the East Bayside Promenade: one between Gates E and F, and one between Gates F and G. Each of the canopies will be 125 feet long and 20 feet wide. Each canopy will be supported by four columns at 35 feet on center, with 10-foot cantilevers at either end. The canopies will be constructed of steel and glass, and will include photovoltaic cells. The canopy structures will include lighting, passenger information, and 12 two-sided benches, for a total of 24 benches under each canopy.

The new deck will be constructed on the piles, using a system of beam-and-flat-slab-concrete construction, similar to what has been built in the Ferry Building area. The beam-and-slab construction will be either precast or cast-in-place concrete (or a combination of the two), and approximately 2.5 feet thick. Above the structure, granite paving or a concrete topping slab will provide a finished pedestrian surface.

The passenger facilities, amenities, and public space improvements—such as the entrance portals, canopy structures, lighting, guardrails, and furnishings—will be surface-mounted on the

pier structures after the new construction and repair are complete. The canopies and entrance portals will be constructed offsite, delivered to the site, craned into place by barge, and assembled onsite. The glazing materials, cladding materials, granite pavers, guardrails, and furnishings will be delivered to the site via truck and assembled onsite. In addition to the use of barges for material storage and construction staging, when the structural deck of the Embarcadero Plaza has been completed, it will also be used for material storage and for construction staging.

**Figure 1. Proposed Project Location and Proposed Site at The San Francisco Ferry Terminal, South Basin**



## **2.3. Description of Alternatives**

### **2.3.1. Alternative 1 – Issuance of an Authorization with Mitigation Measures**

The proposed action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, we would issue an IHA (valid from July 1 through December 31, 2016) to WETA allowing the incidental take, by Level B harassment, of seven species of marine mammals, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the proposed IHA, if issued, along with any additions based on consideration of public comments.

#### **MITIGATION, MONITORING, AND REPORTING MEASURES**

As described in Section 1.2.1, we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider WETA's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measures to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the measures to minimize adverse impacts as planned; and (3) the practicability of the measures for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);
- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);
- Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base; activities that block or limit passage to or from biologically important areas; permanent destruction of habitat; or temporary destruction/disturbance of habitat during a biologically important time; and
- For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

To reduce the potential for disturbance associated with the activities, WETA has proposed to implement several monitoring and mitigation measures for marine mammals. NMFS has proposed some additional measures. The proposed monitoring and mitigation measures include:

1. Time restrictions: For all in-water pile driving activities, WETA shall operate only during daylight hours, and to minimize impacts to Chinook salmon, will only operate between June 1 and November 30.
2. Marine mammal monitoring by NMFS-approved protect species observers (PSOs) from platforms on shore during construction activities;
3. Establishing level B harassment zone in which behavioral harassment may occur and exposures will be monitored;
4. Establishing shutdown zones within which marine mammals could be exposed to received sound levels associated with injury during the construction activities;
5. Implement use of ramp-up and soft start techniques for impact pile driving activities.
6. Employ use of sound attenuation devices including bubble curtains to reduce impacts from sound exposure.

WETA is required to submit a draft monitoring report to NMFS Office of Protected Resources within 90 days after the conclusion of the activities. A final report shall be prepared and submitted within 30 days following resolution of any comments on the draft report from NMFS. A description of the activities conducted by WETA and the monitoring protocols would be included in the report.

In our *Federal Register* notice of proposed Authorization, which we incorporate by reference, we preliminarily determined that the measures included in the proposed Authorization were sufficient to reduce the effects of WETA's activity on marine mammals to the level of least practicable impact. In addition, we described our analysis of impacts and preliminarily determined that the taking of small numbers of marine mammals, incidental to WETA's project would have a negligible impact on the relevant species or stocks and would not have an unmitigable adverse impact on affected species or stocks for taking for subsistence uses. Accordingly, this Preferred Alternative would satisfy the purpose and need of our proposed action under the MMPA—issuance of an Authorization, along with required mitigation measures and monitoring that meets the standards set forth in section 101(a)(5)(D) of the MMPA and the implementing regulations.

### **2.3.2. Alternative 2 – No Action Alternative**

We are required to evaluate the No Action Alternative per CEQ NEPA regulations. The No Action Alternative serves as a baseline to compare the impacts of the Preferred and other Alternatives. Under the No Action alternative, we would not issue an IHA to WETA for the proposed construction project.

Under the No Action Alternative, WETA could choose not to proceed with their proposed activities or to proceed without an IHA. If they choose the latter, WETA would not be exempt

from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

For purposes of this EA, we characterize the No Action Alternative as WETA not receiving an IHA and WETA conducting construction activities for its proposed San Francisco Ferry Terminal Expansion Project, South Basin Project without the protective measures and reporting requirements required by an IHA under the MMPA. We take this approach to meaningfully evaluate the primary environmental issues—the impact on marine mammals from these activities in the absence of protective measures.

#### **2.4. Alternatives Considered but Eliminated from Further Consideration**

NMFS considered whether other alternatives could meet the purpose and need and support WETA's proposed construction project. An alternative that would allow for the issuance of an IHA with no required mitigation or monitoring was considered but eliminated from consideration, as it would not be in compliance with the MMPA and therefore would not meet the purpose and need. For that reason, this alternative is not analyzed further in this document.

## **Chapter 3    Affected Environment**

This chapter describes existing conditions in the proposed action areas. Complete descriptions of the physical, biological, and social environment of the action area are contained in the documents listed in Section 1.3.1 of this EA. We incorporate those descriptions by reference and briefly summarize or supplement the relevant sections for marine mammals in the following subchapters.

### **3.1. Physical Environment**

We are required to consider impacts to the physical environment under NOAA NAO 216-6, as preserved by NAO 216-6A. As discussed in Chapter 1, our proposed action and alternatives relate only to the authorization of incidental take of marine mammals and not to the physical environment. Certain aspects of the physical environment are not relevant to our proposed action (see subchapter 1.3.2 - Scope of Environmental Analysis). Because of the requirements of NAO 216-6, we briefly summarize the physical components of the environment here.

#### **3.1.1. Marine Mammal Habitat**

We presented information on marine mammal habitat and the potential impacts to marine mammal habitat in the *Federal Register* notice of the proposed Authorization. In summary, although there are nearby haulouts for California sea lions at pier 39, behavioral disturbances that could result from anthropogenic sound associated with these activities are expected to affect only a relatively small number of individual marine mammals that may venture near the ferry terminal, although those effects could be recurring over the life of the project if the same individuals remain in the project vicinity. Further, there are no ocean bottom structures of significant biological importance to marine mammals within the ensonified area, and no critical habitat exists in the area of the proposed activities.

#### **3.1.2. Ambient Sound**

The need to understand the marine acoustic environment is critical when assessing the effects of anthropogenic noise on marine wildlife. Sounds generated by coastal construction such as pile driving and dredging within the marine environment can affect its inhabitants' behavior (e.g., deflection from loud sounds) or ability to effectively live in the marine environment (e.g., masking of sounds that could otherwise be heard).

Ambient sound levels are the result of numerous natural and anthropogenic sounds that can propagate over large distances and vary greatly on a seasonal and spatial scale. These ambient sounds occupy all frequencies and contributions in ocean soundscape from a few hundred Hz to 200 kHz (NRC, 2003). In typical urban coastal waters such as the one at the proposed action area, the main sources of underwater ambient sound would be associated with:

- Wind and wave action



- Precipitation
- Vessel activities
- Biological sounds (e.g. fish, snapping shrimp)

The contribution of these sources to the background sound levels differs with their spectral components and local propagation characteristics (e.g., water depth, temperature, salinity, and ocean bottom conditions). In deep water, low-frequency ambient sound from 1-10 Hz mainly comprises turbulent pressure fluctuations from surface waves and the motion of water at the air-water interfaces. At these infrasonic frequencies, sound levels depend only slightly on wind speed. Between 20-300 Hz, distant anthropogenic sound (ship transiting, etc.) dominates wind-related sounds. Above 300 Hz, the ambient sound level depends on weather conditions, with wind- and wave-related effects mostly dominating sounds. Biological sounds arise from a variety of sources (e.g., marine mammals, fish, and shellfish) and range from approximately 12 Hz to over 100 kHz. The relative strength of biological sounds varies greatly; depending on the situation, biological sound can be nearly absent to dominant over narrow or even broad frequency ranges (Richardson et al. 1995).

### **3.2. Biological Environment**

The primary component of the biological environment that would be impacted by the proposed action and alternatives would be marine mammals, which would be directly impacted by the authorization of incidental take. We briefly summarize this component of the biological environment here.

#### **3.2.1. Marine Mammal Habitat**

The action area is within designated EFH for Pacific groundfish, coastal pelagics, and Pacific Coast salmon. The proposed action may result in temporarily impaired water quality conditions, and temporarily elevated noise levels within the action area during pile installation activities. The project will also result in a small amount of direct impacts to benthic and aquatic habitat at the site associated with pile footprints and new overwater structure. Pile installation activities could disturb sediments and temporarily increase turbidity within waterbodies that represent EFH Pacific groundfish, coastal pelagics, and Pacific Coast salmon. Section 1.4.2 describes how the proposed action incorporates several conservation measures intended to avoid and/or minimize potential effects to habitat. That section also concludes that impacts from the proposed action will be temporary or will be fully mitigated and will result in no significant effects to any functional component of EFH for Pacific groundfish, coastal pelagics, and Pacific Coast salmon.

We presented information on marine mammal habitat and the potential impacts to marine mammal habitat in the *Federal Register* notice of the proposed Authorization. In summary, marine mammal prey (i.e., fish) may be present in the project area but not in high densities,

except during the April - May period when spawning herring are likely to be present, but no construction activities are to occur.

### 3.2.2. Marine Mammals

We provide information on the occurrence of marine mammals most likely present in the proposed activity areas in section 1.1.2 of this EA. The marine mammals most likely to be harassed incidental to conducting the San Francisco Ferry Terminal Expansion Project, South Basin Improvements are: California sea lions and Pacific harbor seals, Northern elephant seals, Northern fur seals, Harbor porpoise, gray whales, and bottlenose dolphins (Table 3). None of these species are listed as threatened or endangered under the Endangered Species Act.

**Table 3. Marine Mammals Potentially Present in the Vicinity of San Francisco ferry terminal.**

Species name	Stock(s) abundance Estimate <sup>1</sup>	ESA* Status	MMPA** Status	Frequency of Occurrence in project area
California sea lion ( <i>Zalophus californianus</i> )	U.S. stock	Not listed	Not strategic, non-depleted	Common
Harbor seal ( <i>Phoca vitulina</i> )	California stock	Not listed	Not strategic, non-depleted	Common
Northern Elephant seal ( <i>Mirounga angustirostris</i> )	California breeding stock	Not listed	Not strategic, non-depleted	Rare
Northern fur seal ( <i>Callorhinus ursinus</i> )	California stock	Not listed	Not strategic, non-depleted	Unlikely
Harbor porpoise ( <i>Phocoena phocoena</i> )	San Francisco-Russian River stock	Not listed	Not strategic, non-depleted	Common
Gray whale ( <i>Eschrichtius robustus</i> )	Eastern N. Pacific stock	Not listed	Not strategic, non-depleted	Rare
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	California coastal stock	Not listed	Not strategic, non-depleted	Rare

<sup>1</sup> 2015 marine mammal Stock Assessment Reports at <http://www.nmfs.noaa.gov/pr/sars/species.htm>.

\*Endangered Species Act

\*\*Marine Mammal Protection Act

### California Sea Lion

California sea lions range all along the western border of North America. The breeding areas of the California sea lion are on islands located in southern California, western Baja California, and the Gulf of California (Caretta et al 2015). Although California sea lions forage and conduct many activities in the water, they also use haul-outs. California sea lions breed in Southern California and along the Channel Islands during the spring. The current population estimate for California sea lions is 296,750 animals. This species is not considered strategic under the MMPA, and is not designated as depleted. This species is also not listed under the ESA. PBR is 9,200 (Caretta et al, 2015). Interactions with fisheries, boat collisions, human interactions, and entanglement are the main threats to this species (Caretta et al 2015).

El Niño affects California sea lion populations, with increased observations and strandings of this species in the area. Current observations of this species in CA have increased significantly over the past few years. Additionally, as a result of the large numbers of sea lion strandings in 2013, NOAA declared an unusual mortality event (UME). Although the exact causes of this UME are unknown, two hypotheses meriting further study include nutritional stress of pups resulting from a lack of forage fish available to lactating mothers and unknown disease agents during that time period.

California sea lions occurrence at the proposed project area is common, and their presence is expected.

### **Pacific Harbor Seal**

The Pacific harbor seal is one of five subspecies of *Phoca vitulina*, or the common harbor seal. There are five species of harbor seal in the Pacific EEZ: (1) California stock; (2) Oregon/Washington coast stock; (3) Washington Northern inland waters stock; (4) Southern Puget Sound stock; and (5) Hood Canal stock. Only the California stock occurs in the action area and is analyzed in this document. The current abundance estimate for this stock is 30,968. This stock is not considered strategic or designated as depleted under the MMPA and is not listed under the ESA. PBR is 1,641 animals per year. The average annual rate of incidental commercial fishery mortality (30 animals) is less than 10% of the calculated PBR (1,641 animals); therefore, fishery mortality is considered insignificant (Allen and Angliss, 2013).

### **Northern Elephant Seal**

Northern elephant seals breed and give birth in California (U.S.) and Baja California (Mexico), primarily on offshore islands (Stewart et al. 1994), from December to March (Stewart and Huber 1993). Although movement and genetic exchange continues between rookeries, most elephant seals return to natal rookeries when they start breeding (Huber et al. 1991). The California breeding population is now demographically isolated from the Baja California population, and is the only stock to occur near the action area. The current abundance estimate for this stock is 179,000 animals, with PBR at 4,882 animals (Caretta et al 2015). The population is reported to have grown at 3.8% annually since 1988 (Lowry et al. 2014). Fishery interactions and marine debris entanglement are the biggest threats to this species (Caretta et al 2015). Northern elephant

seals are not listed under the Endangered Species Act, nor are they designated as depleted, or considered strategic under the MMPA.

### **Northern Fur Seal**

Northern fur seals occur from southern California north to the Bering Sea and west to the Okhotsk Sea and Honshu Island, Japan. During the breeding season, approximately 74% of the worldwide population is found on the Pribilof Islands in the southern Bering Sea, with the remaining animals spread throughout the North Pacific Ocean (Lander and Kajimura 1982). Of the seals in U.S. waters outside of the Pribilofs, approximately one percent of the population is found on Bogoslof Island in the southern Bering Sea, San Miguel Island off southern California (NMFS 2007), and the Farallon Islands off central California. Two separate stocks of northern fur seals are recognized within U.S. waters: an Eastern Pacific stock and a California stock (including San Miguel Island and the Farallon Islands). Only the California breeding stock is considered here since it is the only stock to occur near the action area. The current abundance estimate for this stock is 14,050 and PBR is set at 451 animals (Caretta et al 2015). This stock has grown exponentially during the past several years. Interactions with fisheries remains the top threat to this species (Caretta et al, 2015). This stock is not considered depleted or classified as strategic under the MMPA, and is not listed under the ESA.

### **Harbor Porpoise**

In the Pacific, harbor porpoise are found in coastal and inland waters from Point Conception, California to Alaska and across to Kamchatka and Japan (Gaskin 1984). Harbor porpoise appear to have more restricted movements along the western coast of the continental U.S. than along the eastern coast. Regional differences in pollutant residues in harbor porpoise indicate that they do not move extensively between California, Oregon, and Washington (Calambokidis and Barlow 1991). That study also showed some regional differences within California (Allen and Angliss, 2014). Of the 10 stocks of Pacific harbor porpoise, only the San Francisco- Russian River stock is considered here since it is the only stock to occur near the action area. This current abundance estimate for this stock is 9,886 animals, with a PBR of 66 animals (Caretta et al 2015). Current population trends are not available for this stock. The main threats to this stock include fishery interactions. This stock is not designated as strategic or considered depleted under the MMPA, and is not listed under the ESA.

### **Gray Whale**

Once common throughout the Northern Hemisphere, the gray whale was extinct in the Atlantic by the early 1700s. Gray whales are now only commonly found in the North Pacific. Genetic comparisons indicate there are distinct “Eastern North Pacific” (ENP) and “Western North Pacific” (WNP) population stocks, with differentiation in both mtDNA haplotype and microsatellite allele frequencies (LeDuc et al. 2002; Lang et al. 2011a; Weller et al. 2013). Only the ENP stock occurs in the action area and is considered in this document. The current population estimate for this stock is 20,990 animals, with PBR at 624 animals (Caretta et al, 2015). The population size of the ENP gray whale stock has increased over several decades despite an UME in 1999 and 2000 and has been relatively stable since the mid-1990s. Interactions with fisheries, ship strikes, entanglement in marine debris, and habitat degradation are the main concerns for the gray whale population (Caretta et al 2015). This stock is not listed

under the ESA, and is not considered a strategic stock or designated as depleted under the MMPA.

### **Bottlenose Dolphin**

Bottlenose dolphins are distributed worldwide in tropical and warm-temperate waters. In many regions, including California, separate coastal and offshore populations are known (Walker 1981; Ross and Cockcroft 1990; Van Waerebeek et al. 1990). There are genetic differences between the populations; based on nuclear and mtDNA analyses, there are no shared haplotypes between coastal and offshore animals and significant genetic differentiation between the two ecotypes was evident (Caretta et al 2008). California coastal bottlenose dolphins are found within about one kilometer of shore (Hansen, 1990; Carretta et al. 1998; Defran and Weller 1999) primarily from Point Conception south into Mexican waters, at least as far south as San Quintin, Mexico. Oceanographic events appear to influence the distribution of animals along the coasts of California and Baja California, Mexico, as indicated by El Nino events. There are three stocks of bottlenose dolphins in the Pacific: 1) California coastal stock, 2) California, Oregon, and Washington offshore stock, and 3) Hawaiian stock. Only the California coastal stock may occur in the action area. The current stock abundance estimate for the California coastal stock is 323 animals, with PBR at 2.4 animals (Caretta et al 2008). Pollutant levels in California are a threat to this species, and this stock may be vulnerable to disease outbreaks, particularly morbillivirus (Caretta et al 2008). This stock is not listed under the ESA, and is not considered strategic or designated as depleted under the MMPA.

### **3.3. Social Environment**

Because our proposed action and alternatives relate only to the authorization of incidental take of marine mammals, the components of the social environment are not relevant to our proposed action (see subchapter 1.3.2 - Scope of Environmental Analysis). Therefore, no further analysis of the social environment is required here.

## **Chapter 4 Environmental Consequences**

This chapter of the EA analyzes the impacts of the two alternatives and addresses the potential direct, indirect, and cumulative impacts of our issuance of an IHA. WETA's application and other related environmental analyses identified previously, inform an analysis of the direct, indirect, and cumulative effects of our proposed issuance of an Authorization

Under the MMPA, we have evaluated the potential impacts of WETA's construction program activities on the affected marine mammal species or stocks in order to determine whether to authorize incidental take of marine mammals. Under NEPA, we have determined that an EA is appropriate to evaluate the potential significance of environmental impacts resulting from the issuance of an IHA.

### **4.1. Effects of Alternative 1 – Issuance of an IHA with Mitigation Measures**

Alternative 1 is the Preferred Alternative, under which we would issue an IHA to WETA allowing the incidental take, by Level B harassment, of seven species of marine mammals from July 1 through November 30, 2016, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the IHA, if issued. We would incorporate the mitigation and monitoring measures and reporting described earlier in this EA (see Section 2.3.1) into a final IHA.

#### **4.1.1. Impacts to Marine Mammal Habitat**

No permanent impacts to marine mammal habitat are proposed to or would occur as a result of the proposed Project. The WETA's proposed San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project would not modify the existing habitat. Therefore, no restoration of the habitat would be necessary. A temporary, small-scale loss of foraging habitat may occur for marine mammals, if the marine mammals leave the area during pile extraction and driving activities.

Acoustic energy created during pile replacement work would have the potential to disturb fish within the vicinity of the pile replacement work. As a result, the affected area could temporarily lose foraging value to marine mammals. During pile driving, high noise levels may exclude fish from the vicinity of the pile driving. Hastings and Popper (2005) identified several studies that suggest fish will relocate to avoid areas of damaging noise energy. The acoustic frequency and intensity ranges that have been shown to negatively impact fish (FHWG 2008) and an analysis of the potential noise output of the proposed Project indicate that Project noise has the potential to cause temporary hearing loss in fish over a distance of approximately 42 meters from pile driving activity. If fish leave the area of disturbance, pinniped foraging habitat in that area may have temporarily decreased foraging value when piles are driven using impact hammering.

The duration of fish avoidance of this area after pile driving stops is unknown. However, the affected area represents an extremely small portion of the total foraging range of marine mammals that may be present in and around the project area.

Because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or marine mammal populations.

#### 4.1.2. Impacts to Marine Mammals

We expect that behavioral disturbance or displacement resulting from the activities associated with the Project has the potential to impact marine mammals and comprises the only likely source of effects to marine mammals. The majority of impacts are likely to occur from pile driving and pile removal activities. Pile driving and removal activities associated with the construction could cause pinniped behavioral modification and temporary displacement within the vicinity of the action area through: (1) noise generated from pile removal and pile driving; and (2) visual disturbance from construction activities and crew. These activities are not anticipated to result in injury, serious injury, or mortality of any marine mammal species and none is proposed to be authorized. Our notice of proposed Authorization and WETA’s application (2016) provide detailed descriptions of these potential effects of the proposed project activities on marine mammals. That information is incorporated herein by reference and summarized next.

Based on this information, we expect that the proposed activities would result, at worst, in a temporary modification in behavior and/or temporary changes in animal distribution (Level B harassment) of certain species or stocks of marine mammals. At most, we interpret these effects on marine mammals as falling within the MMPA definition of Level B (behavioral) harassment. We expect these impacts to be minor because we do not anticipate measurable changes to the population or impacts to rookeries, mating grounds, and other areas of similar significance.

We expect no long-term or substantial adverse effects on marine mammals, their habitats, or their role in the environment. We base our conclusion on the results of previous monitoring for the same activities and anecdotal observations for the same activities in the proposed area.

#### Estimated Take of Marine Mammals by Level B Incidental Harassment

As discussed above, in-water pile removal and pile driving (vibratory and impact) generate loud noises that could potentially harass marine mammals in the vicinity of WETA’s proposed San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project.

Currently, NMFS uses 120 dB re 1  $\mu$ Pa and 160 dB re 1  $\mu$ Pa at the received levels for the onset of Level B harassment from non-impulse (vibratory pile driving and removal) and impulse sources (impact pile driving) underwater, respectively. Table 4 summarizes the current NMFS marine mammal take criteria.

**Table 4. Current Acoustic Exposure Criteria for Non-explosive Sound Underwater**

Criterion	Criterion Definition	Threshold
Level A Harassment (Injury)	Permanent Threshold Shift (PTS) (Any level above that which is known to cause TTS*)	180 dB re 1 $\mu$ Pa (cetaceans) / 190 dB re 1 $\mu$ Pa (pinnipeds) root mean square (rms)

Level B Harassment	Behavioral Disruption (for impulse noises)	160 dB re 1 $\mu$ Pa (rms)
Level B Harassment	Behavioral Disruption (for non-impulse noise)	120 dB re 1 $\mu$ Pa (rms)
Level B harassment (airborne)	Behavioral disruption	90 dB (harbor seals) 100dB (other pinnipeds) (unweighted)

\*Temporary Threshold Shift

As explained above, ZOIs will be established that encompass the areas where received underwater SPLs exceed the applicable thresholds for Level A and Level B harassment.

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a ZOI during active pile removal or driving. Expected marine mammal presence is determined by past observations and general abundance near the project area during the construction window. Typically, potential take is estimated by multiplying the area of the ZOI by the local animal density. This provides an estimate of the number of animals that might occupy the ZOI at any given moment. This calculation was used for harbor seals and California sea lions. For all other marine mammals, local densities are not available; therefore the following calculation was used: number of animals in the area multiplied by the number of days of noise generating activities. To account for the increase in California sea lion density due to El Niño, the daily take estimated from the observed density has been increased by a factor of 10 for each day that pile driving occurs.

Table 5 outlines the number of Level B harassment takes that we propose to authorize in this Authorization, the regional population estimates for marine mammals in the action area, the percentage of each population or stock that may be taken as a result of WETA's activities, and the trend of each marine mammal population. Our proposed Authorization notice and WETA's application contain complete descriptions of how these take estimates were derived.

**Table 5. Summary of potential marine mammal takes and percentage of stocks affected.**

Species	Proposed Authorized Takes	Stock(s) Abundance Estimate <sup>1</sup>	Percentage of Total Stock (%)
Harbor Seal ( <i>Phoca vitulina</i> ) <i>California stock</i>	4,426	30,968	14.3
California sea lion ( <i>Zalophus californianus</i> ) <i>U.S. Stock</i>	7,660	296,750	2.6
Northern elephant seal ( <i>Mirounga anustirostris</i> ) <i>California breeding stock</i>	21	179,000	0.01
Northern fur seal ( <i>Callorhinus ursinus</i> ) <i>California stock</i>	10	14,050	0.07
Harbor Porpoise ( <i>Phocoena phocoena</i> ) <i>San Francisco-Russian River Stock</i>	9	9,886	0.09
Gray whale ( <i>Eschrichtius robustus</i> ) <i>Eastern North Pacific stock</i>	2	20,990	0.01
Bottlenose dolphin ( <i>Tursiops truncatus</i> ) <i>California coastal stock</i>	30	323	9.3



### *Harbor Seals*

Although generally solitary in the water, harbor seals congregate at haulouts to rest, socialize, breed, molt. Habitats used as haul-out sites include tidal rocks, bayflats, sandbars, and sandy beaches (Zeiner et al., 1990). Haul-out sites are relatively consistent from year-to-year (Kopeck and Harvey, 1995), and females have been recorded returning to their own natal haul-out when breeding (Cunningham et al., 2009). Long-term monitoring studies have been conducted at the largest harbor seal colonies in Point Reyes National Seashore and Golden Gate National Recreation Area since 1976. Castro Rocks and other haulouts in San Francisco Bay are part of the regional survey area for this study and have been included in annual survey efforts. Between 2007 and 2012, the average number of adults observed ranged from 126 to 166 during the breeding season (March through May), and from 92 to 129 during the molting season (June through July) (Truchinski et al., 2008; Flynn et al., 2009; Codde et al., 2010; Codde et al., 2011; Codde et al., 2012; Codde and Allen, 2015). Marine mammal monitoring at multiple locations inside San Francisco Bay was conducted by Caltrans from May 1998 to February 2002, and determined that at least 500 harbor seals populate San Francisco Bay (Green et al., 2002). This estimate is consistent with previous seal counts in the San Francisco Bay, which ranged from 524 to 641 seals from 1987 to 1999 (Goals Project, 2000). Although harbor seals haul-out at approximately 20 locations in San Francisco Bay, there are three locations that serve as primary locations: Mowry Slough in the south Bay, Corte Madera Marsh and Castro Rocks in the north Bay, and Yerba Buena Island in the central Bay (Grigg, 2008; Gible, 2011). The main pupping areas in the San Francisco Bay are at Mowry Slough and Castro Rocks (Caltrans, 2012). Pupping season for harbor seals in San Francisco Bay spans from approximately March 15 through May 31, with pup numbers generally peaking in late April or May (Caretta et al 2015). Births of harbor seals have not been observed at Corte Madera Marsh and Yerba Buena Island, but a few pups have been seen at these sites. Harbor seals forage in shallow waters on a variety of fish and crustaceans that are present throughout much of San Francisco Bay, and therefore could occasionally be found foraging in the action area as well. Monitoring of marine mammals in the vicinity of the SFOBB has been ongoing for 15 years; from those data, Caltrans has produced at-sea density estimates for Pacific harbor seal of 0.77 animals per square kilometer for the fall season (Caltrans, 2015b). Using this density, the potential average daily take for the areas over which the Level B harassment thresholds may be exceeded are estimated as follows:

- Vibratory driving and extraction of 36-inch steel piles: Based on an at-sea density of 0.77 animal per square kilometer, and the 86.53-square- kilometer area over which the Level B harassment may be exceeded, rounds to 66 animals per day, may be exposed to Level B harassment, for a total of 4,290 harbor seal takes from vibratory driving, and 66 harbor seal takes for vibratory removal.
- Vibratory extraction of wood and concrete piles: Based on an at-sea density of 0.77 animal per square kilometer, and the 2.3-square- kilometer area over which the Level B harassment may be exceeded, rounds to two animals per day, may be exposed to Level B harassment, for a total of 60 harbor seal takes.

- Vibratory driving of polyurethane -coated wood piles: Based on an at-sea density of 0.77 animal per square kilometer, and the 0.13-square- kilometer area over which the Level B harassment may be exceeded, rounds to one animal per day, may be exposed to Level B harassment, for a total of 10 harbor seal takes.

A total of 4,426 harbor seal takes are estimated for 2016. This take number is larger than the take number in the proposed IHA. This change was based on public comment and take was increased based on using fall densities instead of summer densities, to be more representative of the season in which construction will occur and may affect harbor seals.

### *California sea lion*

In San Francisco Bay, sea lions haul out primarily on floating K docks at Pier 39 in the Fisherman’s Wharf area of the San Francisco Marina. The Pier 39 haul out is approximately 1.5 miles from the project vicinity. The Marine Mammal Center (TMMC) in Sausalito, California has performed monitoring surveys at this location since 1991. A maximum of 1,706 sea lions was seen hauled out during one survey effort in 2009 (TMMC, 2015). Winter numbers are generally over 500 animals (Goals Project, 2000). In August to September, counts average from 350 to 850 (NMFS, 2004). Of the California sea lions observed, approximately 85 percent were male. No pupping activity has been observed at this site or at other locations in the San Francisco Bay (Caltrans, 2012). The California sea lions usually frequent Pier 39 in August after returning from the Channel Islands (Caltrans, 2013). In addition to the Pier 39 haul-out, California sea lions haul out on buoys and similar structures throughout San Francisco Bay. They mainly are seen swimming off the San Francisco and Marin shorelines within San Francisco Bay, but may occasionally enter the project area to forage.

Although there is little information regarding the foraging behavior of the California sea lion in the San Francisco Bay, they have been observed foraging on a regular basis in the shipping channel south of Yerba Buena Island. Foraging grounds have also been identified for pinnipeds, including sea lions, between Yerba Buena Island and Treasure Island, as well as off the Tiburon Peninsula (Caltrans, 2001). Monitoring of marine mammals in the vicinity of the SFOBB has been ongoing for 15 years; from those data, Caltrans has produced at-sea density estimates for California sea lion of 0.31 animals per square mile (0.12 animal per square kilometer) for the summer season (Caltrans, 2015b). Using this density, the potential average daily take for the areas over which the Level B harassment thresholds may be exceeded (Table 8) is estimated as follows:

- Vibratory driving and extraction of 36-inch steel piles: Based on an at-sea density of 0.12 animals per square kilometer and the 86.53-square-kilometer area over which the Level B harassment may be exceeded, rounds to 11 animals per day, may be exposed to Level B harassment for a total of 11 California sea lion takes for vibratory removal and 715 California sea lion takes for vibratory driving. To account for the increased

occurrence of California sea lions due to El Niño, these numbers were multiplied by 10 for a total of 110 and 7,150 California sea lion takes, respectively.

- Vibratory extraction of wood and concrete piles: Based on an at-sea density of 0.12 animal per square kilometer, and the 2.3-square-kilometer area over which the Level B harassment may be exceeded, rounds to one animal per day, may be exposed to Level B harassment for a total of 30 California sea lion takes. To account for the increased occurrence of California sea lions due to El Niño, this number was multiplied by 10 for a total of 300 California sea lion takes.
- Vibratory driving of polyurethane -coated wood piles: Based on an at-sea density of 0.12 animal per square kilometer, and the 0.14-square-kilometer area over which the Level B harassment may be exceeded rounds to one animal per day, may be exposed to Level B harassment for a total of 10 California sea lion takes. To account for the increased occurrence of California sea lions due to El Niño, this number was multiplied by 10 for a total of 100 California sea lion takes.

A total of 7,660 California sea lion takes is estimated for 2016.

#### *Northern elephant seal*

Northern elephant seals are common on California coastal mainland and island sites where they pup, breed, rest, and molt. The largest rookeries are on San Nicolas and San Miguel islands in the Northern Channel Islands. In the vicinity of San Francisco Bay, elephant seals breed, molt, and haul out at Año Nuevo Island, the Farallon Islands, and Point Reyes National Seashore (Lowry et al., 2014). Adults reside in offshore pelagic waters when not breeding or molting. Northern elephant seals haul out to give birth and breed from December through March, and pups remain onshore or in adjacent shallow water through May, when they may occasionally make brief stops in San Francisco Bay (Caltrans, 2015b). The most recent sighting was in 2012 on the beach at Clipper Cove on Treasure Island, when a healthy yearling elephant seal hauled out for approximately one day. Approximately 100 juvenile northern elephant seals strand in San Francisco Bay each year, including individual strandings at Yerba Buena Island and Treasure Island (fewer than 10 strandings per year) (Caltrans, 2015b). When pups of the year return in the late summer and fall to haul out at rookery sites, they may also occasionally make brief stops in San Francisco Bay.

Monitoring of marine mammals in the vicinity of the SFOBB has been ongoing for 15 years; from those data, Caltrans has produced an estimated at-sea density for northern elephant seal of 0.16 animal per square mile (0.03 animal per square kilometer) (Caltrans, 2015b). Most sightings of northern elephant seal in San Francisco Bay occur in spring or early summer, and are less likely to occur during the periods of in-water work for this project (June/July through November). As a result, densities during pile driving for the proposed action would be much lower. Therefore, we estimate that it is possible that a lone northern elephant seal may enter the

Level B harassment area once per week during pile driving, for a total of 21 takes in 2016. This take number is larger than the take number in the proposed IHA. This change was based on public comment and take was increased from 14 to 21 to be more representative of the number of weeks during construction activities over 106 days (21 weeks vs 14 weeks) if one individual was in the Level B harassment area once per week.

#### *Northern fur seal*

The range of the northern fur seal extends from southern California, north to the Bering Sea and west to the Okhotsk Sea and Honshu Island, Japan (Caretta et al 2014). During the breeding season, the majority of the worldwide population is found on the Pribilof Islands in the southern Bering Sea, with the remaining animals spread throughout the North Pacific Ocean. On the coast of California, small breeding colonies are present at San Miguel Island off southern California, and the Farallon Islands off central California (Caretta et al 2014). Northern fur seals are a pelagic species and are rarely seen near the shore away from breeding areas. Juveniles of this species occasionally strand in San Francisco Bay, particularly during El Niño events, for example, during the 2006 El Niño event, 33 fur seals were admitted to the Marine Mammal Center (TMMC, 2016). Some of these stranded animals were collected from shorelines in San Francisco Bay. Due to the recent El Niño event, Northern fur seals are being observed in San Francisco Bay more frequently, as well as strandings all along the California coast and inside San Francisco Bay; a trend that is expected to continue this summer through winter (TMMC, personal communication). Because sightings are normally rare, and instances recently have been observed, but are not common, it is estimated that ten Northern fur seals will be taken in 2016.

#### *Harbor porpoise*

In the last six decades, harbor porpoises were observed outside of San Francisco Bay. The few harbor porpoises that entered were not sighted past central Bay close to the Golden Gate Bridge. In recent years, however, there have been increasingly common observations of harbor porpoises in central, north, and south San Francisco Bay. Porpoise activity inside San Francisco Bay is thought to be related to foraging and mating behaviors (Keener, 2011; Duffy, 2015). According to observations by the Golden Gate Cetacean Research team as part of their multi-year assessment, over 100 porpoises may be seen at one time entering San Francisco Bay; and over 600 individual animals are documented in a photo-ID database. However, sightings are concentrated in the vicinity of the Golden Gate Bridge and Angel Island, north of the project area, with lesser numbers sighted south of Alcatraz and west of Treasure Island (Keener 2011). Harbor porpoise generally travel individually or in small groups of two or three (Sekiguchi, 1995).

Monitoring of marine mammals in the vicinity of the SFOBB has been ongoing for 15 years; from those data, Caltrans has produced an estimated at-sea density for harbor porpoise of 0.01 animal per square mile (0.004 animal per square kilometer) (Caltrans, 2015b). However, this

estimate would be an overestimate of what would actually be seen in the project area. In order to estimate a more realistic take number, we assume it is possible that a small group of individuals (three harbor porpoises) may enter the Level B harassment area on as many as three days of pile driving, for a total of nine harbor porpoise takes per year. This take number is larger than the take number in the proposed IHA. This change was based on public comment and take was increased by increasing the number of potential days harbor porpoise may be near the construction activity and incidentally harassed from two to three days to be conservative.

#### *Gray whale*

Historically, gray whales were not common in San Francisco Bay. The Oceanic Society has tracked gray whale sightings since they began returning to San Francisco Bay regularly in the late 1990s. The Oceanic Society data show that all age classes of gray whales are entering San Francisco Bay, and that they enter as singles or in groups of up to five individuals. However, the data do not distinguish between sightings of gray whales and number of individual whales (Winning, 2008). Caltrans Richmond-San Rafael Bridge project monitors recorded 12 living and two dead gray whales in the surveys performed in 2012. All sightings were in either the central or north Bay; and all but two sightings occurred during the months of April and May. One gray whale was sighted in June, and one in October (the specific years were unreported). It is estimated that two to six gray whales enter San Francisco Bay in any given year. Because construction activities are only occurring during a maximum of 106 days in 2016, it is estimated that two gray whales may potentially enter the area during the construction period, for a total of 2 gray whale takes in 2016.

#### *Bottlenose dolphin*

Since the 1982-83 El Niño, which increased water temperatures off California, bottlenose dolphins have been consistently sighted along the central California coast (Caretta et al 2008). The northern limit of their regular range is currently the Pacific coast off San Francisco and Marin County, and they occasionally enter San Francisco Bay, sometimes foraging for fish in Fort Point Cove, just east of the Golden Gate Bridge. In the summer of 2015, a lone bottlenose dolphin was seen swimming in the Oyster Point area of South San Francisco (GGCR, 2016). Members of this stock are transient and make movements up and down the coast, and into some estuaries, throughout the year. Bottlenose dolphins are being observed in San Francisco bay more frequently in recent years (TMMC, personal communication). Groups with an average group size of five animals enter the bay and occur near Yerba Buena Island once per week for a two week stint and then depart the bay (TMMC, personal communication). Assuming groups of five individuals may enter San Francisco Bay approximately three times during the construction activities, we estimate 30 takes of bottlenose dolphins for 2016.

## **4.2. Effects of Alternative 2 – No Action Alternative**

Under the No Action Alternative, we would not issue an IHA to WETA. As a result, WETA would not receive an exemption from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

The impacts to elements of the human environment resulting from the No Action Alternative—conducting the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project in the absence of required protective measures for marine mammals under the MMPA—would be greater than those impacts resulting from Alternative 1, the Preferred Alternative.

#### **4.2.1. Impacts to Marine Mammal Habitat**

Under the No Action Alternative, the effects on the physical environment or on components of the biological environment that function as marine mammal habitat would result from WETA's planned construction activities, are similar to those described in Section 1.4.2. Even without mitigation measures, however, impacts to marine mammal habitat (including prey species) would be minimal and temporary for the following reasons:

- Vibratory driving will be the preferred method of pile installation. Impact driving will be utilized only when vibratory driving is not tenable due to local geotechnical conditions.
- The area of potential effect is limited in both space and time ; and
- There are no rookeries or major haul-out sites nearby or ocean bottom structure of significant biological importance to marine mammals that may be present in the ensonified area.

The most likely impact to marine mammal habitat would be minor impacts to the immediate substrate during installation of piles and removal of falsework during the project or temporary avoidance by prey species of the immediate area. This Alternative would result in similar effects on the physical environment and components of the biological environment that function as marine mammal habitat as Alternative 1.

#### **4.2.2. Impacts to Marine Mammals**

Under the No Action Alternative, WETA's planned construction activities could result in increased amounts of Level B harassment to marine mammals, although no takes by injury (Level A harassment), serious injury, or mortality would be expected even in the absence of mitigation and monitoring measures. While it is difficult to provide an exact number of takes that might occur under the No Action Alternative, the numbers would be expected to be larger than those presented in Table 5 above, because WETA would not be required to follow mitigation measures designed to warn marine mammals of the impending increased underwater sound levels, and additional species may be incidentally taken because MOS would not be required to shut down activity if any marine mammals occurred in the project vicinity.

If the activities proceeded without the protective measures and reporting requirements required by a final Authorization under the MMPA, the direct, indirect, and cumulative effects on the human or natural environment of not issuing the IHA would include the following:

- Increases in the number of behavioral responses and potential takes to additional species, because of the lack of mitigation measures required in the Authorization. Thus, the incidental take of marine mammals would likely occur at higher levels than we have already identified and evaluated in our Federal Register notice on the proposed Authorization; and
- We would not be able to obtain the monitoring and reporting data needed to assess the anticipated impact of the activity upon the species or stock and to increase knowledge of the species, as required under the MMPA.

#### **4.3. Compliance with Necessary Laws – Necessary Federal Permits**

We have determined that the issuance of an IHA is consistent with the applicable requirements of the MMPA, MSFMCA, and our regulations. Please refer to Section 1.4 of this EA for more information.

#### **4.4. Unavoidable Adverse Impacts**

WETA's application, our notice of a proposed Authorization, and the other environmental analyses identified previously summarize unavoidable adverse impacts to marine mammals or to their populations to which they belong or on their habitats occurring in the proposed project area. We incorporated those documents by reference.

We acknowledge that the incidental take authorized would potentially result in unavoidable adverse impacts including marine mammal behavioral responses and alterations in the distribution of local populations as a result of the Project. However, we do not expect WETA's activities to have adverse consequences on the annual rates of recruitment or survival of marine mammals in the Pacific Ocean or in San Francisco Bay, and we do not expect the marine mammal populations in that area to experience reductions in reproduction, numbers, or distribution that might appreciably reduce their likelihood of surviving or recovering in the wild. We expect that the numbers of individuals of all species taken by harassment would be small (relative to species or stock abundance) and that the proposed Project and the take resulting from the proposed project activities would have a negligible impact on the affected species or stocks of marine mammals.

The MMPA requirement of ensuring the proposed action has no unmitigable adverse impact to subsistence uses does not apply here because there are no permitted subsistence uses of marine mammals in the region.

#### **4.5. Cumulative Effects**

NEPA defines cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

This cumulative effects analysis focuses on activities that may temporally or geographically overlap with WETA’s activities and would most likely impact the marine mammals present in the proposed areas. We consider the impact of WETA’s presence and effects of conducting activities in the proposed action areas to be insignificant when compared to other human activities in the area.

Past, present, and reasonably foreseeable impacts to marine mammal populations include the following: climate change; coastal development; marine pollution; disease; increased vessel traffic, marine mammal watching, and fishing gear entanglement, and other current and future projects. These activities account for cumulative impacts to regional and worldwide populations of marine mammals, many of which are a small fraction of their former abundance. However, quantifying the biological costs for marine mammals within an ecological framework is a critical missing link to our assessment of cumulative impacts in the marine environment and assessing cumulative effects on marine mammals (Clark *et al.*, 2009). Despite these regional and global anthropogenic and natural pressures, available trend information indicates that most local populations of marine mammals in the Pacific Ocean are stable or increasing (Carretta *et al.*, 2013).

The proposed construction project would add another, albeit localized and temporary, activity in central California. This activity would be limited to a small area in the San Francisco Bay for a relatively short period of time. This section provides a brief summary of the human-related activities affecting the marine mammal species in the action area.

#### **4.5.1. Climate Change**

The primary threat to marine mammals is from loss of habitat and potential changes in food supply due to climate change. Sea level rise due to climate change could flood pinniped haul-out sites negatively impacting breeding success. Moreover, researchers anticipate that there would be long-term impacts to marine mammals resulting from climate change that could alter their composition and distribution in central California (USFWS, 2013).

With the large degree of uncertainty on the impact of climate change to marine mammals in central California, we recognize that warming of this region could affect the prey base and habitat quality for marine mammals. Nonetheless, we expect that ongoing and future WETA activities in San Francisco Bay and the issuance of an IHA to WETA would not result in any noticeable contributions to climate change. Furthermore, there would be no additive or



synergistic effects from climate change on the marine mammals listed in the Authorization resulting from the authorization of take.

The precise effects of global climate change on the action area, however, cannot be predicted at this time because the coastal marine ecosystem is highly variable in its spatial and temporal scales.

#### **4.5.2. Coastal Development**

Urban and coastal development encompasses housing, businesses, transportation infrastructure, streets and parking lots, domestic wastewater effluent, floating structures, and mixing zones. Coastal development not only displaces organisms that once used a particular site but also indirectly affects a much broader area through non-point source and point source pollution. However, WETA's proposed project consists largely of the re-development of an area that already supports a built environment. Therefore, the proposed WETA Project will have a very limited cumulative effect on coastal development in central California.

#### **4.5.3. Marine Pollution**

Marine mammals are exposed to contaminants via the food they consume, the water in which they swim, and the air they breathe. Point and non-point source pollutants from coastal runoff, offshore mineral and gravel mining, at-sea disposal of dredged materials and sewage effluent, marine debris, and organic compounds from aquaculture are all lasting threats to marine mammals in the project area. The long-term impacts of these pollutants, however, are difficult to measure.

WETA's activities associated with the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project are not expected to cause increased exposure of pollutants to marine mammals in the project vicinity due to the small scale and localized nature of the activities.

#### **4.5.4. Disease**

Disease is common in many marine mammal populations and has been responsible for major die-offs worldwide, but such events are usually relatively short-lived. WETA's construction activities are not expected to affect the disease rate among marine mammals in the project vicinity.

#### **4.5.5. Increased Vessel Traffic**

The construction activities are designed to add additional wharfs to the ferry terminal, thereby increase the capacity and efficiency of the existing terminal for shipping needs. With an increase in vessel traffic to the Ferry Terminal, there is a potential for increased noise and ship strikes.

New vessels that may use the Ferry Terminal may add to the acoustic environment. However, because this area is already an industrial area with an increased acoustic environment, additional vessels may not increase sound levels to a measurable degree. The potential for increased ship

strikes may be a possibility; however, it is unlikely due to vessels moving slowly and following established, common navigation lanes, and the nature of the marine mammal behavior and low occurrence in this area. Therefore, there is limited potential that incremental effects associated with the San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project that may lead to increased vessel traffic would measurably affect marine mammals in the project area.

#### **4.5.6. Marine Mammal Watching**

Although marine mammal watching is considered by many to be a non-consumptive use of marine mammals with economic, recreational, educational and scientific benefits, it is not without potential negative impacts. One concern is that animals may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle *et al.*, 1993; Laist *et al.*, 2001; Jensen and Silber, 2004). Another concern is that preferred habitats may be abandoned if disturbance levels are too high. Several recent research efforts have monitored and evaluated the impacts of people closely approaching, swimming, touching and feeding marine mammals and has suggested that marine mammals are at risk of being disturbed (“harassed”), displaced or injured by such close interactions. Researchers investigating the adverse impacts of marine mammal viewing activities have reported boat strikes, disturbance of vital behaviors and social groups, separation of mothers and young, abandonment of resting areas, and habituation to humans (Nowacek *et al.*, 2001, Bejder et al 2006, Higham et al 2009).

While marine mammal watching operations do occur in the vicinity of the proposed project area, WETA’s authorized pile driving activities are of short duration encompassing a relatively small area, therefore, the cumulative adverse effects of the proposed action on the affected populations when added to the effects of marine mammal watching are not expected to be significant.

#### **4.5.7. Commercial and Recreational Fishing**

Commercial and recreational fishing constitute a significant use of the ocean area along the California coastline. There are 519 recognized California marine fish species. According to the California Department of Fish and Game (CDFG), in 2013, the three top commercial finfish species by landing in the San Francisco port were Dover sole (629,466 pounds), chinook salmon (565,537 pounds), and swordfish (522,594 pounds). The total commercial landings for all species brought into the San Francisco port in 2013 were valued at almost 20 million dollars, with dockside landings totaling over 11 million pounds (CDFG, 2014). In addition, recreational and charter fishing activities are popular along the waters of central California. These activities could result in by-catch of marine mammals, entanglement in fishing gear, and reduced prey availability for marine mammals. However, the activities associated with this project are of short duration encompassing a relatively small area, therefore, the cumulative adverse effects of the proposed action on the affected populations when added to the effects of commercial and recreational fishing are not expected to be significant.

#### **4.5.8. Past, Present, and Reasonably Foreseeable Future Actions**

This section focuses on the past, present, or reasonably foreseeable future activities that may temporally or geographically overlap with WETA's activities and would most likely impact the marine mammals present in the proposed area.

##### **4.5.8.1. San Francisco-Oakland Bay Bridge Construction Activity**

Since November 2003, the California Department of Transportation (CALTRANS) has been conducting construction of a replacement bridge for the East Span of the San Francisco-Oakland Bay Bridge (SF-OBB), in San Francisco Bay (SFB), California. Specific activities that have the potential to impact marine mammals include vibratory and impact pile driving.

NMFS has issued annual IHAs to CALTRANS for its construction activities every year, beginning in 2003. The most recent IHA was issued to CALTRANS on July 17, 2015, and expires on July 16, 2016 (80 FR 43710).

However, the CALTRANS SF-OBB work has a small noise footprint and is located approximately 2-4 miles east of the Ferry Terminal. Furthermore, noise-generating in-water construction activities, such as pile driving and removal, only occur sporadically (e.g., they only occurred on 5 days in 2013). Monitoring reports from CALTRANS indicate that impacts on marine mammals from CALTRANS SF-OBB construction activities are negligible, and that there is no long-term displacement of marine mammals observed. Based on these, we conclude that the combined effects from CALTRANS and WETA on the environment are expected to be non-significant due to the small scale of these activities and the separation in location.

#### **4.5.9. Marine Mammal Research and Geophysical Seismic Surveys**

Marine mammal research and geophysical seismic survey cruises operate within the Pacific Ocean along the California coast. While some marine mammal surveys introduce no more than increased vessel traffic impacts to the environment, seismic surveys use various methods (e.g., airgun arrays) to conduct research. The use of airguns during seismic surveys does not impact pinnipeds while they are hauled out, only when they are in the water. Other studies that involve biopsy sampling and tagging might result in Level B or even Level A harassment to marine mammals. There are active research permits along the California coastline that allow activities that have the potential to result in either Level A or Level B harassment (e.g., vessel/aerial surveys, photo-identification, collection of sloughed skin, tagging, capture and handling, etc.). Many of these permits only allow the incidental harassment of California sea lions, Pacific harbor seals, and northern elephant seals during studies of other marine mammal species in the vicinity. NMFS has authorized seismic surveys along the Pacific coast in the past, but there are currently no active geophysical seismic surveys occurring in central California waters, and none are proposed to occur in the foreseeable future. Results from research studies conducted in the area indicate that the activities only have temporary, short-term impacts on the behavior of the animals. The activities do not result in the injury or mortality of the animals.

#### **4.5.10. Other Scientific Research Activities**

Research on other animal species, such as seabirds, has historically occurred along the California coastline. There is currently only one active Authorization for the incidental harassment of pinnipeds during scientific research studies for seabird research; however, these research activities do not occur in the vicinity of the proposed Project.

#### **4.5.11. Conclusion**

Based on the summation of activity in the area provided in this section, NMFS determined that the incremental impact of an Authorization for the proposed San Francisco Ferry Terminal Expansion Project, South Basin Improvements Project in San Francisco Bay would not be expected to result in a significant cumulative impact to the human environment, taking into account past, present, and reasonably foreseeable future activities. The potential impacts to marine mammals, their habitats, and the human environment in general are expected to be minimal, based on the limited and temporary footprint of the proposed Project and the mitigation and monitoring requirements of the IHA.

## **Chapter 5 List of Preparers and Agencies Consulted**

### **Agencies Consulted**

No other persons or agencies were consulted in preparation of this EA.

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## Chapter 6 Literature Cited

- Allen, B.M. and R.P. Angliss. 2014. Alaska marine mammal stock assessments, 2013. NOAA Technical Memorandum NMFS-AFSC-277, National Marine Fisheries Service: 304.
- Bejder, L., A. Samuels, H. Whitehead, N. Gales, J. Mann, R. Connor, et al. 2006. Decline in relative abundance of bottlenose dolphins exposed to long-term disturbance. *Conservation Biology* **20** (6):1791-1798.
- Caltrans (California Department of Transportation), 2001. San Francisco – Oakland Bay Bridge East Span Seismic Safety Project, Pile Installation Demonstration Project. Marine Mammal Impact Assessment. PIDP EA 012081. Caltrans Contract 04A0148. Task Order 205.10.90.
- Caltrans (California Department of Transportation). 2012. Compendium of pile driving sound data. California Department of Transportation: 215.
- Caltrans (California Department of Transportation), 2013. San-Francisco-Oakland Bay Bridge East Span Seismic Safety Project Revised Marine Mammal Monitoring Plan. Available online at:  
[http://www.biomitigation.org/pdfs/2013\\_revised\\_marine\\_mammal\\_monitoring\\_plan.pdf](http://www.biomitigation.org/pdfs/2013_revised_marine_mammal_monitoring_plan.pdf). Accessed on February 26, 2014.
- Caltrans. 2015a. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish -2015. Authored by David Buehler, P.E., Rick Oestman, James Reyff, Keith Pommerenck, Bill Mitchell. Available online at:  
[http://www.dot.ca.gov/hq/env/bio/files/bio\\_tech\\_guidance\\_hydroacoustic\\_effects\\_110215.pdf](http://www.dot.ca.gov/hq/env/bio/files/bio_tech_guidance_hydroacoustic_effects_110215.pdf).
- Caltrans (California Department of Transportation), 2015b. Incidental Harassment Authorization Application: Activities Related to the Demolition of Pier E3 of the East Span of the Original San Francisco-Oakland Bay Bridge.
- Caretta, J.V., Forney, K.A., Lowry, M. S., Barlow, J., Baker, J., Johnston, D., Hanson, B., Muto, M.M., Lynch, D., and L. Cardwell. 2008. U.S. Pacific Marine Mammal Stock Assessments: 2008. NOAA Technical Memorandum NMFS. NOAA-TM-NMFS-SWFSC-434.
- Carretta, J.V., K.A. Forney, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, and M.M. Muto. 2013. U.S. Pacific marine mammal stock assessments: 2012. U.S. Dep. Commer. NOAA Tech. Memo. NMFS-SWFSC-504. 378 pp.
- Carretta, J.V., E. Oleson, D.W. Weller, A.R. Lang, K.A. Forney, J. Baker, et al. 2014. U.S. Pacific marine mammal stock assessments: 2013. NOAA Technical Memorandum NMFS-SWFSC-532, National Marine Fisheries Service: 414.

- Carretta, J.V., Oleson, E.M., Baker, J., Weller, D.W., Lang, A.R., Forney, K.A., Muto, M.M., Hanson, B., Orr, A.J., Huber, H., Lowry, M.S., Barlow, J., Moore, J.E., Lynch, D., Carswell, L., and R.L. Brownell Jr. 2015. U.S. Pacific Marine Mammal Stock Assessments: 2015. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-561.
- CDFG (California Department of Fish and Game). 2014. Final California Commercial Landings for 2013. State of California, The Natural Resources Agency, Department of Fish and Game. <http://www.dfg.ca.gov/marine/landings/landings13.asp>.
- Clark, C.W., W.T. Ellison, B.L. Southall, L. Hatch, S.M. Van Parijs, A. Frankel, and D. Ponirakis. 2009. Acoustic masking in marine ecosystems: intuitions, analysis, and implication. *Marine Ecology Progress Series* **395**:201-222.
- Codde, S and S. Allen. 2015. Pacific Harbor Seal (*Phoca vitulina richardsi*) Monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area. 2013 Annual Report. Natural Resource Report NPS/SFAN/NRR—2015/919. National Park Service, U.S. Department of the Interior, Natural Resource Stewardship and Science. February.
- Codde, S., D. Press, D. Roberts, and S. Allen, 2010. Pacific Harbor Seal (*Phoco vitulina richardsi*) Monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area. 2010 Annual Report. Natural Resource Technical Report NPS/SFAN/NRTR – 2011/465.
- Codde, S., D. Press, D. Roberts, and S. Allen, 2011. Pacific Harbor Seal (*Phoco vitulina richardsi*) Monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area. 2011 Annual Report. Natural Resource Technical Report NPS/SFAN/NRTR – 2012/611.
- Codde, S., D. Press, D. Roberts, and S. Allen, 2012. Pacific Harbor Seal (*Phoco vitulina richardsi*) Monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area. 2012 Annual Report. Natural Resource Technical Report NPS/SFAN/NRTR – 2013/806.
- Cunningham, L., Baxter, J.M., Boyd, I.L., Duck, C.D., Lonergan, M., Moss, S.E. and McConnell, B., 2009. Harbour seal movements and haul-out patterns: implications for monitoring and management. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 19(4), pp.398-407.
- Defran, R.H., Weller, D.W., Kelly, D.L. and Espinosa, M.A., 1999. Range characteristics of Pacific coast bottlenose dolphins (*Tursiops truncatus*) in the Southern California Bight. *Marine Mammal Science*, 15(2), pp.381-393.

Duffy, L., 2015. Patterns of habitat use by harbor porpoise (*Phocoena phocoena*) in central San Francisco Bay. Master's Thesis, San Francisco State University.

FHWG (Fisheries Habitat Working Group). 2008. Agreement in Principal for Interim Criteria for Injury to Fish from Pile Driving Activities. Memorandum of Agreement between NOAA fisheries' Northwest and Southwest Regions; USFWS Regions 1 and 8; California, Washington, and Oregon Departments of Transportation; California Department of Fish and Game; and Federal Highways Administration. June 12, 2008.

Flynn, E., D. Press, S. Codde, D. Roberts, and S. Allen, 2009. *Pacific harbor seal (Phoca vitulina richardsi) monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area: 2008 annual report*. Natural Resource Technical Report NPS/SFAN/NRTR—2009/267. National Park Service, Fort Collins, Colorado.

Gaskin, D.E. and Watson, A.P., 1984. The harbor porpoise. *Phocoena phocoena*, p.18.

GGCR (Golden Gate Cetacean Research), 2016. Bottlenose Dolphin Project. Available online at: <http://www.ggcetacean.org/bottlenose-dolphin.html>. Accessed on March 22, 2016.

Gibble, Corinne Michele, 2011. Food habits of harbor seals (*Phoca vitulina richardii*) in San Francisco Bay, California. San Jose State University.

Goals Project, 2000. Baylands ecosystem species and community profiles: life histories and environmental requirements of key plants, fish, and wildlife of the San Francisco Bay Area. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project, P.R. Olofson, ed. San Francisco Bay Regional Water Quality Control Board, Oakland, California.

Green, D.E., E. Grigg, S. Allen, and H. Marowitz, 2002. Monitoring the Potential Impact of the Seismic Retrofit Construction Activities at the Richmond San Rafael Bridge on Harbor Seals (*Phoca vitulina*): May 1998-February 2002. Draft Interim Report.

Grigg, E.K. 2008. Environmental predictors of habitat use patterns of Pacific harbor seals (*Phoca vitulina richardii*) in an urbanized estuary. ProQuest.

Hansen, L.J., 1990. California Coastal Bottlenose Dolphins 23. *The bottlenose dolphin*, p.403.

Hastings, M.C. and A.N. Popper. 2005. Effects of sound on fish. Prepared by Jones & Stokes for the California Department of Transportation: 82.

Huber, H.R., Rovetta, A.C., Fry, L.A. and Johnston, S., 1991. Age-specific natality of northern elephant seals at the South Farallon Islands, California. *Journal of mammalogy*, 72(3), pp.525-534.



- Jensen, A., and G.K. Silber. 2004. Large Whale Ship Strike Database. NOAA Technical Memorandum NMFS-OPR-25. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, MD.
- Keener, B., 2011. Safe Harbor: Welcoming Porpoises Back to San Francisco Bay. *Bay Nature*, July- September.
- Kopec, A.D. and Harvey, J., 1995. Toxic pollutants, health indices and population dynamics of harbor seals in San Francisco Bay, 1989-1992.
- Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet and M. Podesta. 2001. Collisions between ships and whales. *Marine Mammal Science* 17(1):35-75
- Lander, R.H. and Kajimura, H., 1982. Status of northern fur seals. *Mammals in the Seas: Small cetaceans, seals, sirenians and otters*, 4, p.319.
- Lang, A.R., Weller, D.W., LeDuc, R., Burdin, A.M., Pease, V.L., Litovka, D., Burkanov, V. and Brownell Jr, R.L., 2011. Genetic analysis of stock structure and movements of gray whales in the eastern and western North Pacific. In *19th Biennial Conference on the Biology of Marine Mammals. Tampa, Florida*.
- LeDuc, R.G. and Dizon, A.E., 2002. Reconstructing the rorqual phylogeny: With comments on the use of molecular and morphological data for systematic study. *Molecular and Cell Biology of Marine Mammals*, pp.100-110.
- Lowry, M.S., Condit, R., Hatfield, B., Allen, S.G., Berger, R., Morris, P.A., Le Boeuf, B.J. and Reiter, J., 2014. Abundance, distribution, and population growth of the northern elephant seal (*Mirounga angustirostris*) in the United States from 1991 to 2010. *Aquatic Mammals*, 40(1), p.20.
- NMFS (National Marine Fisheries Service), 2004. Final Environmental Assessment of the Issuance of an Incidental Harassment Authorization for the Take of Marine Mammals During Dredging Operations at Pier 39, San Francisco, California. Response to BMMI IHA application. Office of Protected Resources.
- Nowacek, S.M., R.S. Wells and A.R. Solow. 2001. Short-term effects of boat traffic on bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, FL. *Marine Mammal Science* 17(4):673-688
- Ross, G.J. and Cockcroft, V.G., 1990. Comments on Australian bottlenose dolphins and the taxonomic status of *Tursiops aduncus* (Ehrenberg, 1832). *The bottlenose dolphin*, pp.101-128.

- Sekiguchi, K., 1995. Occurrence, behavior and feeding habits of harbor porpoises (*Phocoena phocoena*) at Pajaro Dunes, Monterey Bay, California. Available online at: [http://aquaticmammalsjournal.org/share/AquaticMammalsIssueArchives/1995/AquaticMammals\\_21-02/21-02\\_Sekiguchi.pdf](http://aquaticmammalsjournal.org/share/AquaticMammalsIssueArchives/1995/AquaticMammals_21-02/21-02_Sekiguchi.pdf). Accessed on March 9, 2016.
- Stewart, B.S., Yochem, P.K., Huber, H.R., DeLong, R.L., Jameson, R.J., Sydeman, W.J., Allen, S.G. and Le Boeuf, B., 1994. History and present status of the northern elephant seal population. *Elephant seals: population ecology, behavior, and physiology*, pp.29-48.
- Swingle, W.M., Barco, S.G., Pitchford, T.D., Mclellan, W.A. and Pabst, D., 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. *Marine Mammal Science*, 9(3), pp.309-315.
- TMMC (The Marine Mammal Center), 2015. Celebrate the Sea Lions' 21st Anniversary at Pier 39. The Marine Mammal Center. Available online at: <http://www.marinemammalcenter.org/about-us/News-Room/2011-news-archives/celebrate-the-sea-lions-21st.html>. Accessed on December 18, 2015.
- TMMC (The Marine Mammal Center), 2016. Northern Fur Seal. Available online at: <http://www.marinemammalcenter.org/education/marine-mammal-information/pinnipeds/northern-fur-seal/?referrer=https://www.google.com/>. Accessed on March 9, 2016.
- Truchinski, K., E. Flynn, D. Press, D. Roberts, and S. Allen, 2008. *Pacific harbor seal (Phoca vitulina richardii) monitoring at Point Reyes National Seashore and Golden Gate National Recreation Area: 2007 annual report*. Natural Resource Technical Report NPS/SFAN/NRTR—2008/118. National Park Service, Fort Collins, Colorado.
- USFWS. 2013a. Biological Opinion for the San Francisco Bay Area Water Emergency Transportation Authority Central Bay Operations and Maintenance Facility Project, Alameda, Alameda County, California. March 3, 2013.
- Van Waerebeek, K., Reyes, J.C., Read, A.J. and McKinnon, J.S., 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. *The bottlenose dolphin*, pp.143-154.
- Walker, W. 1981. Geographical variation in morphology and biology of bottlenose dolphins (Tursiops). Report LJ-81-03C, Eastern North Pacific NMFS Southwest Fisheries Center Administration, La Jolla, Calif.
- Weller, D.W., Bettridge, S., Brownell Jr, R.L., Laake, J.L., Moore, J.E., Rosel, P.E., Taylor, B.L. and Wade, P.R., 2013. Report of the National Marine Fisheries Service gray whale

stock identification workshop. *US Department of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-507.*

Winning, Birgitte, 2008. Executive Director, Oceanic Society. Personal communication of data from Gray Whales in the Bay, G. Oliver, J. Gilardi, C. Toropova, P. Folkens, K. Cronin, N. Bodoro, K. Sanchez, D. Wolf, K. Zagzebski, and B. Winning, unpublished report.

Zeiner, D.C., W.F. Laudenslayer, K.E. Mayer, and M. White, 1990. California's Wildlife: Mammals. Volume 3. California Statewide Wildlife Habitat Relationships System. Department of Fish and Game.